

UNITED STATES NAVAL OBSERVATORY
CIRCULAR NO. 32

U. S. Naval Observatory, Washington 25, D. C.

July 23, 1951

POSITIONS, AREAS, AND COUNTS OF SUNSPOTS

MAY, 1951

By Lucy T. Day

These results are based upon measurements made at the Naval Observatory on plates secured either there or at the Mt. Wilson Observatory. The symbols used for the entries in the successive columns are as follows:

U.T., the epoch of observation in Universal Time.

No., the identifying number of the group assigned by Mt. Wilson.

Δl , the heliographic difference in longitude from the central meridian, measured positive to the west.

φ , the heliographic latitude, measured positive to the north.

ρ , the heliocentric angular distance from the line joining the centers of the Earth and Sun.

A , the true area of the umbra plus penumbra, expressed in millionths of the visible hemisphere.

s , the number of spots.

An asterisk means that no Mt. Wilson number was assigned. Plates secured at the Naval Observatory are indicated by N, and those at Mt. Wilson by W. The plate quality, which follows, is indicated by:

1, Poor; 2, Fair; 3, Good; 4, Very Good; 5, Excellent.

The following five quantities are listed successively at the end of each day, and give for that day:

1. The total number of groups, g .
2. The longitude of the central meridian, L_0 .
3. The latitude of the center of the disc, B_0 .
4. The total value of A .
5. The total value of s .

The mean daily area and the mean relative sunspot number, $r=10g+s$ are given at the end of the month.

These results are a continuation of those published in the *Monthly Weather Review* from February 1, 1927 to December 31, 1947.

MAY

U.T.	No.	Δl	φ	ρ	A	s
		$^{\circ}$	$^{\circ}$	$^{\circ}$		
1.653	10652	-24	-13	25	12	5
N-3	10650	-2	-11	7	24	1
	10651	+1	-18	15	48	1
	10651	+3	-17	14	61	1
	10648	+34	-7	34	194	1
	10649	+46	-6	46	97	4
	10649	+53	-5	53	218	1
	10646	+63	+19	66	194	1
	10646	+75	+15	75	291	1
	(6)	(276)	(-4)		1139	16
2.660	10650	+11	-11	13	16	3
N-3	10651	+15	-18	21	61	2
	10651	+20	-18	24	73	3
	10648	+48	-8	48	194	1
	10649	+60	-6	60	61	4
	10649	+67	-5	67	218	1
	10646	+77	+19	78	291	1
	(5)	(263)	(-4)		914	15
3.651	10654	-61	-21	62	6	1
N-3	10651	+28	-19	32	48	3
	10651	+34	-19	36	61	2
	10648	+61	-9	61	194	1
	10649	+81	-6	81	218	1
	(4)	(250)	(-4)		527	8
4.660	10655	-35	+6	36	6	1
N-2	10653	+12	+12	20	6	2
	10651	+41	-19	43	73	3
	10651	+47	-19	48	24	10
	10651	+50	-19	52	61	3
	10648	+75	-9	75	194	1
	(4)	(237)	(-4)		364	20
5.924	10653	+25	+13	29	6	1
W-2	10651	+58	-19	59	121	3
	10651	+66	-19	66	61	6
	(2)	(220)	(-4)		188	10
6.578	10656	+39	-15	41	12	1
W-4	10651	+68	-19	68	242	3
	10651	+73	-17	73	12	1
	10651	+75	-19	75	73	10
	(2)	(211)	(-4)		339	15
7.710	10660	-79	+10	79	242	1
N-3	10659	-58	-9	58	12	1
	(*)	-11	+21	27	12	4
	(*)	+10	-10	12	12	2
	10657	+32	+15	37	12	4
	10651	+82	-19	82	194	1
	(6)	(196)	(-4)		484	13
8.653	10660	-65	+9	66	242	1
N-2	10659	-44	-9	44	6	1
	(*)	-15	-11	16	6	1
	(3)	(184)	(-3)		254	3
9.682	10662	-88	+16	88	873	2
N-3	10662	-82	+13	82	24	1
	10662	-79	+17	79	12	1
	10660	-50	+8	52	218	1
	(2)	(170)	(-3)		1127	5
10.653	10663	-85	+8	85	16	1
N-3	10663	-77	+8	77	194	1

U.T.	No.	Δl	φ	ρ	A	s
		$^{\circ}$	$^{\circ}$	$^{\circ}$		
	10664	-85	+12	85	194	1
	10665	-78	+3	78	36	2
	10662	-75	+13	75	145	3
	10662	-70	+17	71	1551	5
	10662	-65	+15	67	12	1
	10662	-64	+17	66	582	1
	10660	-37	+8	39	218	1
	10661	+6	-14	12	36	4
	10661	+9	-15	15	16	3
	(6)	(157)	(-3)		3000	23
11.883	10664	-69	+12	70	242	1
N-2	10664	-69	+15	71	24	1
	10665	-68	+2	68	97	1
	10665	-62	+3	62	145	7
	10663	-62	+8	64	194	1
	10662	-59	+14	61	339	6
	10662	-56	+12	57	97	4
	10662	-55	+17	58	1551	3
	10662	-50	+15	53	12	1
	10662	-48	+17	52	582	1
	10660	-22	+8	24	218	1
	10666	-3	-10	8	109	10
	10661	+20	-14	22	24	3
	10661	+22	-15	25	36	6
	(7)	(141)	(-3)		3670	46
12.690	10667	-82	+12	82	16	1
N-4	10664	-59	+13	61	36	4
	10664	-58	+12	60	194	1
	10665	-57	+2	57	170	3
	10665	-52	+2	53	48	4
	10663	-53	+7	55	24	5
	10663	-50	+7	52	194	1
	10662	-48	+14	51	533	7
	10662	-48	+18	52	242	3
	10662	-45	+12	47	97	7
	10662	-42	+17	47	1454	3
	10662	-38	+15	42	6	3
	10662	-38	+16	41	436	1
	10660	-10	+8	15	194	1
	10666	+7	-12	11	24	6
	10666	+10	-11	13	12	3
	10661	+32	-15	33	12	1
	(8)	(131)	(-3)		3692	54
13.624	10667	-68	+12	68	145	2
W-4	10664	-43	+11	45	194	1
	10665	-43	+2	43	97	4
	10665	-38	+2	38	48	6
	10663	-39	+7	40	12	5
	10663	-36	+6	37	194	1
	10662	-37	+16	41	1551	6
	10662	-36	+18	42	97	8
	10662	-32	+7	33	97	4
	10662	-30	+14	34	1309	4
	10662	-26	+14	31	24	6
	10662	-25	+10	28	12	1
	10662	-24	+14	30	485	1
	10668	-13	+7	17	61	8
	10660	-3	+9	12	48	9
	10660	+3	+8	12	194	1
	10666	+23	-12	24	24	7
	(8)	(118)	(-3)		4592	74
14.648	(*)	-55	-14	56	6	1
N-3	10667	-54	+12	57	97	2
	(*)	-52	-17	54	12	1
	10664	-30	+11	33	109	1
	10665	-30	+1	30	48	2
	10665	-28	+2	29	12	1
	10665	-22	+1	23	12	1

MAY

U.T.	No.	Δl	φ	ρ	A	s	U.T.	No.	Δl	φ	ρ	A	s
		$^{\circ}$	$^{\circ}$	$^{\circ}$					$^{\circ}$	$^{\circ}$	$^{\circ}$		
	10663	-23	+ 6	24	170	1	18.674	10676	-81	- 6	81	194	1
	10662	-23	+14	28	1891	6	W-2	10675	-75	+21	77	73	1
	10662	-17	+13	23	1309	8		10672	-57	-15	58	24	1
	10662	-12	+17	25	12	1		10672	-54	-14	56	61	7
	10662	-11	+13	20	533	1		10672	-52	-14	53	16	1
	10668	- 1	+ 7	10	73	4		10673	-51	+21	55	145	15
	10669	- 1	- 1	2	12	2		10673	-49	+22	52	48	5
	10660	+10	+10	17	24	2		10673	-47	+22	51	315	1
	10660	+15	+ 6	18	12	8		10671	-41	-13	42	255	1
	10660	+17	+ 7	21	194	1		10674	- 2	- 7	5	24	1
	(10)	(105)	(-3)		4526	43		10667	+ 1	+11	13	73	9
15.651	10671	-81	-13	81	242	1		10664	+20	+10	23	36	11
N-4	(*)	-61	-11	62	12	2		10664	+23	+12	27	61	10
	10667	-40	+12	42	145	4		10664	+25	+13	29	97	4
	10667	-39	+10	41	24	7		10663	+30	+ 5	32	97	3
	10664	-16	+11	22	109	1		10662	+32	+15	35	2230	8
	10664	-15	+12	21	24	7		10662	+38	+14	41	1309	4
	10665	-16	+ 1	17	24	10		10662	+43	+12	45	412	1
	10665	-14	+ 2	16	12	6		10662	+45	+13	47	16	5
	10663	-13	+ 9	18	16	6		10668	+56	+ 8	57	12	2
	10663	-11	+ 6	15	170	1		10660	+71	+ 7	71	194	1
	10662	- 9	+14	19	2133	12		(12)	(51)	(-2)		5692	92
	10662	- 4	+13	17	1406	7	19.655	10676	-69	- 6	69	145	1
	10662	+ 3	+12	15	485	1	W-2	10675	-62	+21	65	73	1
	10668	+13	+ 7	17	16	1		10672	-39	-14	41	61	10
	10670	+19	+19	29	6	1		10673	-38	+20	43	339	7
	10660	+29	+ 7	31	194	1		10673	-32	+23	40	485	5
	(10)	(91)	(-3)		5018	68		10671	-28	-15	32	242	2
16.684	10672	-80	-11	80	145	1		10667	+14	+11	19	61	3
N-4	10672	-78	-12	78	73	4		10667	+15	+10	19	24	8
	10673	-78	+22	78	121	1		10664	+31	+10	33	16	3
	10673	-73	+24	77	97	5		10664	+37	+12	39	36	5
	10671	-66	-12	67	291	1		10664	+38	+ 9	40	12	4
	10667	-28	+12	32	170	16		10664	+39	+13	41	61	2
	10664	- 2	+11	14	97	1		10663	+43	+ 6	44	61	3
	10664	- 4	+12	15	48	11		10662	+44	+15	47	2424	12
	10665	0	+ 1	4	16	10		10662	+52	+14	54	1600	5
	10662	0	+13	16	24	4		10662	+57	+12	58	412	1
	10662	+ 5	+15	19	2036	14		10662	+61	+11	62	24	2
	10662	+ 9	+19	24	218	11		10668	+70	+ 8	70	12	1
	10662	+12	+14	21	1357	4		10660	+84	+ 7	84	194	1
	10662	+15	+18	27	12	10		(11)	(38)	(-2)		6282	76
	10662	+17	+12	22	12	2	20.624	10676	-56	- 6	56	97	1
	10662	+18	+13	24	436	1	W-3	10675	-49	+21	51	36	1
	10663	+ 2	+ 6	9	145	1		10677	-31	+16	34	16	6
	10668	+28	+ 8	31	12	1		10672	-27	-15	31	388	32
	10660	+43	+ 7	43	194	1		10673	-25	+20	33	388	20
	(10)	(78)	(-3)		5504	99		10673	-18	+21	28	533	10
17.664	10672	-69	-13	69	24	2		10673	-17	+19	26	12	1
N-4	10672	-65	-12	65	145	3		10671	-15	-15	20	267	1
	10672	-12	-12	61	12	2		10671	-13	-14	18	12	3
	10673	-63	+23	67	97	10		10667	+28	+11	32	48	2
	10673	-58	+24	62	218	5		10664	+49	+11	50	12	3
	10671	-55	-14	56	6	1		10664	+51	+12	53	24	6
	10671	-53	-12	54	255	1		10663	+56	+ 5	56	61	9
	10674	-16	- 6	17	12	6		10662	+57	+15	59	1794	9
	10667	-13	+12	19	97	1		10662	+61	+17	63	97	2
	10667	-12	+12	19	48	19		10662	+64	+13	65	1648	5
	10664	+11	+11	17	97	1		10662	+69	+11	70	97	4
	10664	+11	+13	18	48	5		10662	+70	+12	71	388	1
	10665	+12	+ 2	13	12	2		10662	+72	+12	73	97	3
	10663	+17	+ 7	20	121	1		(10)	(26)	(-2)		6015	119
	10662	+18	+15	25	2036	9	21.691	10678	-82	-20	82	242	1
	10662	+25	+14	30	1600	10	N-3	10676	-41	- 6	41	97	1
	10662	+30	+12	33	461	1		10675	-34	+21	40	24	1
	10662	+30	+11	32	12	5		10677	-18	+18	27	267	6
	10668	+43	+ 8	44	6	1		10672	-14	-14	19	218	7
	10660	+57	+ 7	58	194	1		10672	-11	-13	15	145	6
	(11)	(65)	(-2)		5501	86		10673	-10	+21	25	533	8
								10673	- 2	+22	23	679	3

MAY

U.T.	No.	ΔI	φ	ρ	A	s	U.T.	No.	ΔI	φ	ρ	A	s
		$^{\circ}$	$^{\circ}$	$^{\circ}$					$^{\circ}$	$^{\circ}$	$^{\circ}$		
	10671	-1	-12	10	291	1	26.663	10679	-61	+16	63	315	1
	10671	+1	-13	11	24	4	N-2	10678	-21	-19	27	6	1
	10667	+41	+11	42	24	1		10678	-19	-19	24	630	1
	10662	+70	+15	71	1067	5		10680	-9	-4	9	12	1
	10662	+71	+17	73	145	1		10676	+25	-6	25	73	1
	10662	+76	+15	77	291	2		10677	+48	+17	51	630	5
	10662	+78	+14	78	2133	4		10677	+49	+15	51	121	1
	10662	+84	+12	84	291	1		10677	+52	+17	54	339	3
	(9)	(12)	(-2)		6471	52		10672	+57	-15	57	12	1
22.706	10678	-78	-19	78	12	1		10673	+57	+18	60	194	1
N-3	10678	-69	-20	69	582	1		10673	+57	+21	59	61	2
	10676	-30	-4	30	6	3		10673	+63	+20	66	679	1
	10676	-28	-5	28	97	1		10371	+64	-17	65	242	1
	10675	-21	+21	31	24	1		(8)	(306)	(-1)		3314	20
	10677	-4	+18	21	436	14	27.678	10679	-49	+15	51	36	3
	10672	-3	-14	13	170	6	N-3	10679	-48	+15	50	388	1
	10672	+2	-11	9	12	3		10678	-8	-22	22	36	6
	10672	+5	-13	12	97	4		10678	-5	-20	19	533	1
	10673	+3	+21	23	436	5		10680	+3	-4	4	6	2
	10673	+7	+23	26	24	8		10676	+40	-8	40	85	1
	10673	+12	+21	27	582	1		10677	+61	+15	62	485	4
	10671	+12	-15	17	206	1		10677	+62	+14	63	97	1
	10667	+54	+10	55	12	2		10677	+68	+15	69	388	1
	10662	+84	+12	84	582	3		10673	+69	+15	70	218	2
	(9)	(358)	(-2)		3278	54		10673	+70	+19	72	97	1
23.646	10678	-59	-19	60	24	3		10673	+77	+19	77	679	1
N-3	10678	-58	-19	59	558	1		10671	+78	-17	78	145	1
	10676	-16	-6	17	73	1		(7)	(292)	(-1)		3193	25
	10675	-7	+21	24	12	1	28.569	10679	-38	+14	41	24	7
	10677	+9	+18	21	388	13	W-4	10679	-34	+14	36	339	1
	10677	+13	+17	22	194	5		10678	+7	-19	18	16	8
	10672	+10	-14	14	48	7		10678	+19	-21	27	533	1
	10672	+12	-14	17	73	3		10680	+17	-4	17	6	1
	10672	+19	-14	22	61	1		10676	+52	-8	52	36	1
	10673	+18	+21	29	97	5		10681	+72	-11	72	48	3
	10673	+18	+18	27	218	2		10677	+73	+15	75	485	5
	10673	+21	+22	32	97	2		10677	+74	+14	76	97	1
	10673	+24	+20	33	776	1		10677	+75	+15	78	97	3
	10671	+26	-16	30	242	1		10677	+78	+15	79	291	2
	(7)	(346)	(-2)		2861	46		10673	+81	+15	81	388	2
24.671	10678	-46	-19	48	16	10		10673	+85	+17	85	194	3
N-3	10678	-44	-19	46	533	1		10673	+87	+19	87	97	11
	10676	-2	-6	5	109	1		(7)	(280)	(-1)		2651	49
	10677	+23	+17	30	436	19	29.798	10679	-22	+16	28	36	4
	10677	+26	+16	32	339	1	N-3	10679	-19	+15	24	436	1
	10672	+23	-15	26	48	15		10678	+20	-20	26	6	1
	10672	+32	-14	33	61	10		10678	+25	-21	31	485	1
	10673	+29	+21	36	97	4		10676	+65	-8	65	24	1
	10673	+30	+19	35	170	1		(3)	(264)	(-1)		987	8
	10673	+32	+22	40	61	6	30.682	10679	-9	+16	18	12	1
	10673	+37	+17	41	12	1	N-3	10679	-7	+14	16	436	1
	10673	+38	+20	42	679	1		10678	+37	-22	41	485	1
	10671	+40	-17	42	242	1		10680	+46	-6	46	12	7
	(6)	(332)	(-2)		2803	71		10680	+49	-7	49	12	1
25.644	10679	-74	+16	76	291	1		10676	+80	-8	80	12	1
N-3	10678	-35	-20	38	36	4		(4)	(253)	(-1)		969	12
	10678	-33	-18	36	36	4	31.647	10684	-72	-3	72	12	1
	10678	-30	-19	33	582	1	N-3	10683	-45	-12	46	6	1
	10676	+11	-6	12	73	1		10679	+5	+15	17	12	1
	10677	+36	+17	40	679	11		10679	+6	+14	16	436	1
	10677	+41	+16	44	339	1		10682	+2	-8	7	12	2
	10672	+35	-15	36	36	6		10678	+49	-22	51	485	1
	10672	+43	-15	44	24	3		(5)	(240)	(-1)		963	7
	10673	+43	+18	47	97	1							
	10673	+43	+21	48	73	5							
	10673	+50	+20	53	679	1							
	10671	+51	-17	52	242	1							
	(7)	(319)	(-2)		3187	40							

Mean for 31 days, $A = 2,887$, $r = 108.3$